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Dated: December 27, 2006 Warren R Kujawa

PATENT

Attorney docket No. 37182-19

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: Application Ser. No. 10/719,314

Filed: 11/20/2003

Examiner: Anh V. La

Art Unit: 2636

RULE 132 DECLARATION OF ALLEN JACOBS

I, Allen Jacobs, hereby declare as follows.

I am the inventor named in this patent application and the vice president of engineering for Reno A & E, Reno, Nevada, the assignee of this patent application. My current responsibilities as vice president generally include overseeing long-range development goals and prioritization of projects for the engineering department of Reno A & E, and providing software and firmware developments for those traffic signal related products manufactured by the company. My specific engineering accomplishments while employed by Reno A & E include leading the company's engineering team during the development of the company's first Malfunction Management Unit (MMU) for NEMA based traffic control systems and a Conflict Monitor Unit (CMU) for Caltrans based traffic control systems.

I have more than 25 years practical experience in the field of traffic control equipment, and I am thoroughly familiar with the structure and function of traffic control signal conflict monitoring equipment used in the United States and Canada.

Since 1986, I have attended several certification programs in the field of traffic control systems.

My professional memberships include:

Member of the Institute of Traffic Engineers (ITE) TENC 103-02 technical committee focusing on the potential use of existing loops at signalized intersections for traffic counts from 2005 to present.

Member of the National Transportation Communications for ITS Protocol (NTCIP) Traffic Sensor Systems (TSS) Workgroup from 2002 to present. This committee is responsible for developing a national communications protocol standard for transferring information between traffic sensing systems and traffic control equipment.

Member of the NEMA Advanced Traffic Controller Committee (ATC) – Cabinet Working Group in 2002. This working group is responsible for defining how all Advanced Traffic Controller equipment will physically interface with each other and all mechanical specifications for the ATC cabinet assembly.

Member of the Citizens Traffic Advisory Committee for the City of Reno, Nevada in 1999 to 2001. This committee is responsible for making recommendations to the Reno City Council on the impacts of building projects proposed to the City that may affect local traffic.

Member of the NEMA Advanced Traffic Controller Committee (ATC) – Detection Working Group from 2000 to 2002. This working group is responsible for defining how Advanced Traffic Controller equipment will interface with traffic detection equipment.

Member of the Transit Standards Consortium (TSC) – Transit Signal Priority Working Group in 1998. This working group is responsible for defining what is Transit Signal Priority and how it will function for the National Transportation Communication for ITS Protocol (NTCIP) standard.

Member of the Transit Communications Interface Protocols (TCIP) – Traffic Management Working Group in 1997. This working group was responsible for defining the data dictionary and messages to be used for transit traffic management centers communicating using the National Transportation Communication for ITS Protocol (NTCIP) standard.

Voting Member of National Electrical Manufacturers Association (NEMA) 2000 to 2003.

Member of the International Municipal Signal Association (IMSA) since 1985.

My other professional activities include:

Guest speaker at the 1995 IMSA Northwest Section Conference. Topic: Transit Priority Preemption Systems.

Chairman of the Traconet Users Group Northwest since 1990 when it was founded until 1999. Editor of the quarterly newsletter.

Guest speaker at the 1992 IMSA Northwest Regional, Eastern Washington, and Western Washington Conferences. Topic: Use of Personal Computers in Traffic Signal Maintenance.

My complete resume is attached as Exhibit A.

I have reviewed the TS2-2003 and TS1-1989 specifications for technical information useful in understanding pedestrian timings, outputs, and monitoring. Attached as Exhibit B is my summary of pertinent sections of these two specifications, along with my explanation of the differences between Flashing Don't Walk conflict monitoring, which is my invention, and Flashing Green detection.
Before my invention, no traffic signal conflict monitoring equipment monitored the flashing DON'T WALK control signals for potential conflict with other traffic control signals.
I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 10011 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dec 17, 2006
date

Allen Jacobs

EXHIBIT A

Allen Joseph Jacobs

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Reno, NV 89511
Home: (775) 852-3703
Email: AJacobs1@NVBell.net

EXPERIENCE

2001-present: Vice President of Engineering for Reno A & E, Reno, Nevada. Responsibilities: Oversee long-range development goals and prioritization of projects for the company's Engineering Department. Software and Firmware development for traffic signal related products. Accomplishments: Lead the engineering team during the development of the company's first Malfunction Management Unit (MMU) for NEMA based traffic control systems and a Conflict Monitor Unit (CMU) for Caltrans based traffic control systems.

2000-2001: Engineering Manager for Reno A & E, Reno, Nevada. Responsibilities: Manage the day-to-day operations of a seven person electronic engineering staff. Software and Firmware development for traffic signal related products. Accomplishments: Develop and implement policies that were key in getting ISO 9001 certification for the company. Developed the boilerplate for and wrote all of the user's manuals for the company's traffic signal products.

1999-2000: Senior Engineer for Reno A & E, Reno, Nevada. Responsibilities: software and firmware development and hardware design reviews for a company that designs and builds traffic signal related products. I wrote firmware, all in assembly, for embedded real time applications using Microchip 16, 17, and 18 series microcontrollers and 80186 microprocessors. I was the only Windows programmer on staff and wrote all applications developed by the company for Windows 95, 98, NT, 2000, and XP in Visual Basic.

1994-1999: Electronics Division Supervisor for the Electronics Division, City of Bremerton, Bremerton, Washington. Responsibilities: Manage the day-to-day operations of a seven person maintenance facility. The Electronics Division is responsible for maintenance of traffic signal and street lighting systems throughout Kitsap County and Mason County, installation and maintenance of the City's six PBX telephone systems supporting over 800 users, maintenance of all instrumentation and control systems at the City's wastewater treatment facility and for the City's Water Department, maintenance and installation of building electrical systems, and maintenance and installation of public safety equipment (2-way radios, light bars, sirens, cellular phones, police radars, etc.) for the City of Bremerton and other local government agencies. Accomplishments: Wrote the City's street lighting standards, Wrote the database application used by the City to track customer service for public complaints and requests.

1980-1994: Electronics Technician for the Electronics Division, City of Bremerton, Bremerton, Washington. Responsibilities: Maintenance and coordination of over 70 traffic signals, installation and maintenance of a PBX supporting over 500 users, maintenance of all instrumentation and control systems at the City's wastewater treatment facility, and maintenance of microcomputer equipment and peripherals. Accomplishments: Designed and installed the oldest and largest working transit preemption system in the nation, for use in the City of Bremerton and Kitsap County by Kitsap Transit. Designed and built three computerized video road logging vehicles. Designed and installed a computerized control system for Kitsap County's road striper. Oversaw the installation of all traffic signal coordination equipment in the City of Bremerton and created all coordination plans used in the city. Researched and wrote bid specifications for the City of Bremerton's Voice Mail, Police Dictation system, various PBX upgrades, and Traffic Signal cabinets. Wrote the program used by the City to track maintenance history and perform time and materials billing.

1980-2003: Owner of AJ Enterprises, a part time computer consulting, programming, and sales business. Customers include: Kitsap County Central Communications (911) for Enhanced 911 Call Tracking and call answering statistics used to determine staffing levels. Clallam – Jefferson Community Action Council for writing a reporting system that allowed agency personnel access to up to date accounting information without having access to the accounting system itself and telephone system maintenance. Kitsap Community Action Program for installing and administering their first network (Novell) and customizations to their accounting software. Kitsap County Public Employees Credit Union for installing their network (Windows for Workgroups) and telephone system maintenance. US Postal Service for Windows based software used to train and evaluate mail clerks on the sorting of mail. Teamsters Local 589 for installing their first network (Windows for Workgroups) and providing advanced Excel spreadsheet support for their accounting personnel. Kitsap Peninsula Vocational Skills Center for developing a program to track student attendance and grades. American Federation of Government Employees for database and spreadsheet development for their accounting personnel. I have

designed, installed, and acted as network administrator on several Microsoft Windows for Workgroups, Windows NT, Windows 2000 and Novell networks. Wrote three commercial software packages for Apple and IBM computers. One for floppy disk drive maintenance & data recovery, one for tracking and analyzing incoming 911 calls and answering time at enhanced 911 centers, and one for logging and analyzing emergency medical service calls for fire departments.

1982-83: Electronics Instructor at Washington Technical Institute, Bremerton, Washington. Responsibilities: Teach solid state theory at a technical school to adult students.

1980: Electronics Technician for Esterline Electronics, Bangor, Washington. Responsibilities: Install and troubleshoot a base wide monitoring and control system. All functions, at the Bangor Naval Submarine Base, from power distribution to security to environmental controls were monitored and controlled by this system. Accomplishments: Hired by a contractor that was 2 years behind schedule when I started. In nine months I had not only got the job back on schedule but actually worked myself out of a job by completing the contract.

TRAINING AND CERTIFICATIONS

2002: Attended a Professional Development Seminar, Managing Projects and People
1998: Recertified in Flagging and Traffic Control for the State of Washington.
1995: Attended a Professional Development Seminar by Fred Pryor, How to Prioritize Your Work.
1995: Completed a course on Confined Space Entry.
1994: Recertified in Adult CPR.
1993: Recertified in Standard First Aid.
1992: Attained a Class A Washington State Commercial Drivers license with air brake endorsement.
1991: Completed a two-week course in Installation and Maintenance of Meridian Mail for Northern Telecom PBXs.
1989: Completed a one-week class on Traconet traffic control systems implementation and programming.
1987: Completed a one-week course in Familiarization with the Northern Telecom SL-1 PBX software.
1987: Completed a two-week course in Data Base Management for the Northern Telecom SL-1 PBX software.
1987: Completed a one-week course in Installation of the Northern Telecom SL-1 S, MS, and ST PBX equipment.
1987: Completed a two-week course in Maintenance of the Northern Telecom SL-1 S, MS, and ST PBX equipment.
1986: Attained Traffic Signal Technician Level II certification from the International Municipal Signal Association.
1986: Attained Traffic Signal Technician Level I certification from the International Municipal Signal Association.
1986: Attended a Professional Development Seminar, Effective Business Communications.
1984: Attended a Professional Development Seminar, Communication: Process, Problems, & People.

EDUCATION

1979-1980: Currently 10 credits short of graduating with an Associates in Technical Arts degree in industrial electronics from Olympic College, Bremerton, Washington, with a grade point average of 3.83. Hired by the City of Bremerton prior to completing my degree.

1979: Graduated top of the Electronics class from the Kitsap Peninsula Vocational Skills Center, Bremerton, Washington.

1979: Honor graduate from North Kitsap Sr. High School, Poulsbo Washington. Maintained an overall G.P.A of 3.5 with a 4.0 G.P.A. in electronics and math classes.

SKILLS

Very proficient in many macro assemblers, interpreted BASICs, compiled BASICs, Microsoft Visual Basic, Visual Basic for Applications (VBA), and Microsoft Access. I have written machine language and BASIC programs for PCs, APPLE IIs, Burroughs B25s, and many embedded systems. I consider myself a professional Visual Basic programmer and Access database developer. Extremely experienced in troubleshooting and repairing PCs. Very proficient in component level troubleshooting of digital and analog systems. Skilled in customer relations, writing bid specifications, preparing bids, budget preparation, and writing user manuals. I am an expert in the use of Word, Excel, Access, Outlook, Visio, Project, PowerPoint, and Visual Basic. I have programmed in assembly for the following processors: Intel 8080, Intel & AMD x86 family, Philips ARM 7, Rockwell 6502, Motorola 6800, Microchip 12 Series, Microchip 16 Series, Microchip 17 Series, Microchip 18 Series, Texas Instruments TMS320LF2406 DSP, and the Atmel AVR family.

EXTRACURRICULAR

Member of the Institute of Traffic Engineers (ITE) TENC 103-02 technical committee focusing on the potential use of existing loops at signalized intersections for traffic counts from 2005 to present.

Member of the National Transportation Communications for ITS Protocol (NTCIP) Traffic Sensor Systems (TSS) Workgroup from 2002 to present. This committee is responsible for developing a national communications protocol standard for transferring information between traffic sensing systems and traffic control equipment.

Member of the NEMA Advanced Traffic Controller Committee (ATC) – Cabinet Working Group in 2002. This working group is responsible for defining how all Advanced Traffic Controller equipment will physically interface with each other and all mechanical specifications for the ATC cabinet assembly.

Member of the Citizens Traffic Advisory Committee for the City of Reno, Nevada in 1999 to 2001. This committee is responsible for making recommendations to the Reno City Council on the impacts of building projects proposed to the City that may affect local traffic.

Member of the NEMA Advanced Traffic Controller Committee (ATC) – Detection Working Group from 2000 to 2002. This working group is responsible for defining how Advanced Traffic Controller equipment will interface with traffic detection equipment.

Member of the Transit Standards Consortium (TSC) – Transit Signal Priority Working Group in 1998. This working group is responsible for defining what is Transit Signal Priority and how it will function for the National Transportation Communication for ITS Protocol (NTCIP) standard.

Member of the Transit Communications Interface Protocols (TCIP) – Traffic Management Working Group in 1997. This working group was responsible for defining the data dictionary and messages to be used for transit traffic management centers communicating using the National Transportation Communication for ITS Protocol (NTCIP) standard.

Voting Member of National Electrical Manufacturers Association (NEMA) 2000 to 2003.

Member of the International Municipal Signal Association (IMSA) since 1985.

Executive board member of the Bremerton Mainstreet Association in 1998 and 1999.

Executive committee member for the Bremerton Blackberry Festival from 1997 to 1999.

Guest speaker at the June 1997 IMSA Northwest Section Meeting. Topic: Bremerton's Experience with Transit Signal Priority Systems.

Guest speaker at the 1995 IMSA Northwest Section Conference. Topic: Transit Priority Preemption Systems.

Chairman of the Traconet Users Group Northwest since 1990 when it was founded until 1999. Editor of the quarterly newsletter.

Member of the Course Advisory Board for the Electronics course at the Kitsap Peninsula Vocational Skills Center from 1982 to 1990.

Member of the Course Advisory Board for the Computer Maintenance course at the Kitsap Peninsula Vocational Skills Center from 1984 to 1992.

Received special recognition from the City of Bremerton, twice for cost savings realized by the City and once for on the job safety.

Guest speaker at the 1982 Associated Public-Safety Communications Officers (APCO) Northwest Regional Conference. Topic: Use of Personal Computers in Local Governments.

Guest speaker at the 1992 IMSA Northwest Regional, Eastern Washington, and Western Washington Conferences. Topic: Use of Personal Computers in Traffic Signal Maintenance.

REFERENCES

Available Upon Request

EXHIBIT B

I found the following references in the TS2-2003 and TS1-1989 specifications to pedestrian timings, outputs, and monitoring.

Section 4.1.1 of the TS2-2003 specification pertaining to conflict determination specifically states "For the purpose of conflict determination, a signal on any of the **Green**, **Yellow**, or **Walk** inputs associated with a channel shall be considered as that channel being active." Similarly, Section 6.1 of the TS-1-1989 specification pertaining to conflict determination specifically states "For purpose of conflict determination, a signal on any of the GREEN, YELLOW, or WALK inputs associated with a channel shall be considered as that channel being in service."
My Flashing Don't Walk Monitoring feature adds monitoring the Don't Walk input, when it is flashing, to the Green, Yellow, and Walk inputs when checking for active channels for the purpose of conflict determination.

TS2-2003

3.4.2.3.2 Load Switch Driver Condition

Means shall be provided, for user definition, of the output condition (**Green**, **Yellow**, or **Red**) of each Vehicle Load Switch Driver Group for each interval. A circuit closure to **Logic Ground** shall be maintained at one of these three outputs at all times. The three outputs shall energize the appropriate vehicle signal load switching circuit to result in a **Green**, **Yellow**, or **Red** indication for the duration of such required indication.

Means shall be provided, for user definition, of the output condition (**Walk**, **Pedestrian Clear**, or **Don't Walk**) of each Pedestrian Load Switch Drivers Group for each interval. A circuit closure to **Logic Ground** shall be maintained on at least one of these three outputs at all times. The three outputs shall energize the appropriate pedestrian signal load switching circuit to result in a **Walk**, **Pedestrian Clearance**, or **Don't Walk** indication. The **Don't Walk** output shall flash only during the **Pedestrian Clearance** interval(s).

3.4.5.3 Outputs

7. **Load Switch Drivers, Pedestrian** (Three Per Group)—Provision of separate **Walk**, **Pedestrian Clearance**, and **Don't Walk** outputs for each pedestrian movement. The three outputs shall energize the appropriate pedestrian signal load switching circuit to result in a **Walk**, **Pedestrian Clearance**, or **Don't Walk** indication. The **Don't Walk** output shall flash only during the **Pedestrian Clearance** interval as shown in Figure 3-12.

3.5.3.2 Phase Intervals

2. **Pedestrian Timing, Concurrent**
Concurrent pedestrian timing shall be permitted in association with any mode of vehicle signal timing. Two time settings shall be required:

a. **Walk**—This shall control the amount of time the **Walk** indication shall be displayed.
b. **Pedestrian Clearance**—This shall control the duration of the **Pedestrian Clearance** output and the flashing period of the **Don't Walk** output.

When a pedestrian call is stored in pedestrian memory and pedestrian indications are concurrent with an associated vehicle phase, the pedestrian sequence shall commence service when

entering the vehicle **Green** of that phase unless the **Pedestrian Omit** line is activated. During the display of the **Walk** and **Pedestrian Clearance** indications, a concurrent **Green** vehicle indication shall be shown. It shall be possible to recycle the pedestrian indications in response to succeeding pedestrian calls for service subject to absence of serviceable conflicting calls (vehicle or pedestrian) and non-activation of the **Pedestrian Omit** line.

3.5.3.12 Outputs

2. **Load Switch Drivers, Pedestrian** (Three Per Phase)—Provision of separate **Walk, Pedestrian Clearance**, and **Don't Walk** outputs for each pedestrian movement. A circuit closure to **Logic Ground** shall be maintained on at least one of these three outputs at all times. The three outputs shall energize the appropriate pedestrian signal load switching circuit to result in a **Walk, Pedestrian Clearance**, or **Don't Walk** indication. The **Don't Walk** output shall flash only during the **Pedestrian Clearance** interval as shown in Figure 3-12.

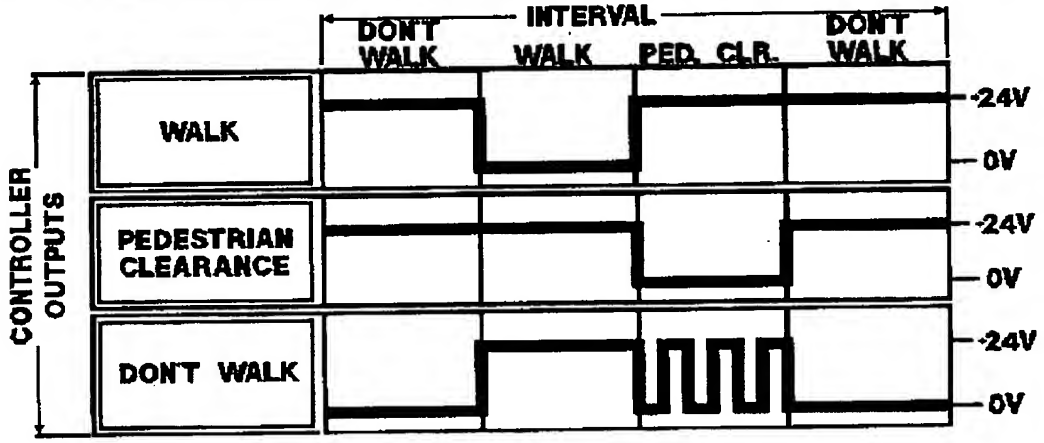

Figure 3-12
LOAD SWITCH DRIVERS, PEDESTRIAN

The **Don't Walk** flashing shall provide an alternating **True/False** output at 1 pulse per second repetition rate with 50 + 2 percent duty cycle.

4.1.1 Basic Capability

The **Signal Monitor** portion of the MMU shall be capable of monitoring for the presence of voltage on conflicting field connection terminals in the CA. For the purpose of conflict determination, a signal on any of the **Green, Yellow**, or **Walk** inputs associated with a channel shall be considered as that channel being active.

The **Signal Monitor** portion of the MMU shall also detect the absence of any required signal voltage on each channel at the field connection terminals in the CA. For this purpose a signal on the **Green, Yellow, Walk**, or **Red/Don't Walk** inputs associated with a channel shall be considered as that channel being active.

4.4.3 Conflict Monitoring

When voltages on any conflicting channels are detected as concurrently active for less than 200 milliseconds, the MMU shall not transfer the **Output** relay contacts to the fault condition. When voltages on any conflicting channels are detected as concurrently active for 450 milliseconds or more, the MMU shall transfer the **Output** relay contacts to the fault condition. When voltages on any conflicting channels are detected as concurrently active for more than 200 milliseconds but less than 450 milliseconds, the MMU may or may not transfer the **Output** relay contacts to the fault condition. The time interval between the beginning of the concurrently conflicting channels and the transfer of the **Output** relay contacts to the fault condition shall not exceed 450 milliseconds. A status bit shall be set in the Type 129 Frame (3.3.1.4) and transmitted to the CU through Port 1.

When the MMU transfers the **Output** relay contacts to the fault condition it shall cause continuity between the open (see 4.3.2.2) and common contacts of the **Output** relay. These contacts shall remain in this fault condition until the unit is reset by the activation of a front panel control or the activation of the **Reset** input.

An MMU **Power Failure** shall not reset the MMU when it has been triggered by a conflict prior to the MMU **Power Failure**.

TS1-1989

6.1 Basic Capability **(NEMA Standard 5-15-1978)**

The SIGNAL MONITOR portion of the CONFLICT MONITOR shall be capable of monitoring conflicting signal indications at the field connection terminals in the controller assembly. For purpose of conflict determination, a signal on any of the GREEN, YELLOW, or WALK inputs associated with a channel shall be considered as that channel being in service.

It shall also detect the absence of any required RED signal voltage at the field connection terminals in the controller assembly. For this purpose a signal on any of the GREEN, YELLOW, WALK, or RED inputs associated with a channel shall be considered as that channel being in service.

6.11 Sensing of Traffic Signal Displays **(NEMA Standard 5-15-1978)**

Four inputs shall be provided for each channel to permit the monitoring of voltages at vehicle GREEN, YELLOW, RED, and WALK signal field terminals. The unit shall be designed so that it shall not be necessary to terminate unused GREEN and YELLOW AND WALK signal sensing inputs when the impedance to AC+ of each of these inputs is less than the equivalent of 1500 picofarads (pf) between the lead and AC+ as measured at the input of the unit.

6.12 Conflict Monitoring **(NEMA Standard 5-15-1978)**

When voltages on any conflicting channels are present concurrently for 450 milliseconds or more, the CONFLICT MONITOR shall trigger. When two signals in conflict with one another are sensed concurrently for less than 200 milliseconds, the CONFLICT MONITOR shall not trigger.

Signals in conflict sensed for 200 milliseconds or more but less than 450 milliseconds may or may not cause the CONFLICT MONITOR to trigger (Authorized Engineering Information 4-7-1983)

When the CONFLICT MONITOR triggers, it shall cause two sets of isolated Form C relay contacts on the OUTPUT relay within the unit to transfer, and these contacts shall remain in this state until the unit is reset by the activation of a front panel control or the activation of the RESET input.

Power interruption shall not reset the CONFLICT MONITOR when it has been triggered by a conflict prior to the power interruption.

must be modified to not require a yellow to start immediately after the green terminates. The sequence test will now wait for a period of time that guarantees that the green is no longer flashing and is in fact off. In general, the modifications needed to deal with a flashing green all revolve around how to deal with the off time when the indication is flashing. The function of the green within the four major monitoring functions does not change.

Flashing Don't Walk Detection - The purpose of my Flashing Don't Walk detection invention is to ensure that a pedestrian clearance interval (flashing don't walk) does not conflict with any other movement at the intersection. The Don't Walk indication is unique at an intersection in that it is the only indication with a dual purpose. When flashing, it indicates that the traffic controller is timing the pedestrian clearance interval, an interval during which it is safe for a pedestrian to be in the crosswalk. When solid, it indicates that it is not safe for the pedestrian to be in the crosswalk. So when the indication is flashing, it needs to be included in the conflict test. When it is solid, it is removed from the conflict test, as is normal.

So, the flashing green requires no rule changes within the monitor, just timing modifications. Where as my flashing don't walk invention requires that the rules for identifying a conflict change to include the don't walk indication only if it is flashing.

Also, the method in which the two indications are tested for flashing is different. The flashing green can flash at several different flash rates, usually faster than the one flash per second of the flashing don't walk indication.